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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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CESARI AND MCKENNA, LLP 88 BLACK FALCON AVENUE BOSTON, MA 02210			EXAMINER CHUO, TONY SHENG HSIANG	
			ART UNIT 1795	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/796,721	Applicant(s) SCHWEIZER, PATRICK M.	
	Examiner Tony Chuo	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3-8 and 18-26 is/are pending in the application.
- 4a) Of the above claim(s) 18-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 June 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Claims 1, 3-8, and 18-26 are currently pending. Claims 2 and 9-17 have been cancelled. New claims 18-26 have been added. Newly submitted claims 18-26 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: The shutter mechanism can be operated by a method that does not comprise moving a movable component disposed within the fuel cell perpendicularly between a source of a reactant and the membrane electrode assembly.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 18-26 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

The previous objection to the specification is withdrawn. The amended claims do overcome the previously stated 102 and 103 rejections. However, upon further consideration, claims 1, 3-8, and 18-26 are rejected under the following new 103 rejections. This action is made FINAL as necessitated by the amendment.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent

and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 1, 3, and 4 are provisionally rejected on the ground of nonstatutory double patenting over claims 1, 2, and 4-6 of copending Application No. 10/413,986.

This is a provisional double patenting rejection since the conflicting claims have not yet been patented.

The subject matter claimed in the instant application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter, as follows: a) a fuel source; b) a fuel cell including a catalyzed membrane electrode assembly, having an anode aspect and a cathode aspect, a mass transport barrier generally between the fuel source and the anode aspect; a movable shutter plate disposed between the mass transport barrier and the anode current collector such that the movable shutter plate is adjustable to

substantially or partially prevent fuel flow through the anode current collector to the anode aspect of the fuel cell; and a load coupled between the anode current collector and the cathode current collector for utilizing the electricity generated by the fuel cell.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanizaki et al (JP 4-274174) in view of Tan (US 5687759).

The Tanizaki reference discloses a shutter mechanism for controlling reactants in a direct methanol fuel cell system, having at least one fuel cell "1" including a membrane electrode assembly, comprising: a fuel source, an anode current collector "39" disposed generally at the anode reaction layer "33b", a cathode current collector "39" disposed generally at the cathode reaction layer "36b", shutter plate "7" disposed within the fuel cell between a source of a reactant and the membrane electrode assembly, wherein the shutter plate has through-holes "6" that correspond with through-holes "8" on anode collector plate "10" such that when the shutter plate is placed adjacent to the anode collector plate, the flow of the reactant is controlled (See page 7, Working Example 1 and Figure 1). It also discloses a shutter plate that is placed between a fuel source and the anode catalyst layer "33b" (See Figures 1 and 5).

However, Tanizaki et al does not expressly teach a moving component having a plurality of laterally displaced protrusions and a receiving element forming a plurality of laterally displaced openings corresponding to the plurality of laterally displaced protrusions. The Tan reference discloses the concept of utilizing a diaphragm "34" supporting a valve plug "60" to plug the opening "24" when the diaphragm is placed adjacent to the receiving element "22" (See Figures 1 and 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Tanizaki shutter plate to include a moving component having a plurality of laterally displaced protrusions and a receiving element forming a plurality of laterally displaced openings corresponding to the plurality of laterally displaced protrusions in order to utilize a means for managing flow in a computer based fluid handling system that provides fast response to an electrical control signal.

Examiner's note: The Tan reference is relevant to the Tanizaki reference and the applicant's field of endeavor because it solves the same problem of controlling the flow of a fluid from an inlet to an outlet.

6. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanizaki et al (JP 4-274174) in view of Guay (US 2005/0058879), and further in view of Tan (US 5687759).

The Tanizaki reference discloses a shutter mechanism a direct methanol fuel cell system comprising: a fuel source and a fuel cell "1" that includes a proton conductive membrane "35" having reaction layers "33b" & "36b" on each of its major surfaces; an

anode current collector "39" disposed generally at the anode reaction layer "33b"; a cathode current collector "39" disposed generally at the cathode reaction layer "36b"; a movable shutter plate "7" disposed within the fuel chamber "32" between a source of a reactant and the anode current collector such that when the movable shutter plate is adjustable to substantially or partially prevent fuel flow through the anode current collector to the anode reaction layer of the fuel cell; and a load coupled between the anode current collector and the cathode current collector for utilizing the electricity generated by the fuel cell (See paragraphs [0002],[0005],[0016] and Figure 1 and 5).

However, Tanizaki et al does not expressly teach a passive mass transport barrier disposed generally between the fuel source and the anode aspect and spaced from the anode aspect to define a vapor gap in the fuel cell, wherein the passive mass transport barrier controls the rate of fuel delivery to the catalyzed anode aspect of the fuel cell. The Guay reference discloses an enhanced planar vaporization membrane "44" disposed in a vapor chamber between the fuel source and the anode catalyst layer of the fuel cell that controls the rate of fuel delivery to the anode catalyst layer of the fuel cell (See paragraphs [0060],[0061]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Tanizaki fuel cell system to include a passive mass transport barrier disposed generally between the fuel source and the anode aspect and spaced from the anode aspect to define a vapor gap in the fuel cell, wherein the passive mass transport barrier controls the rate of fuel delivery to the catalyzed

anode aspect of the fuel cell in order to deliver vapor phase of methanol fuel at higher rates to enable higher power DMFC systems.

However, Tanizaki et al as modified by Guay does not expressly teach a moving shutter plate having a plurality of laterally displaced protrusions disposed within the vapor gap between the passive mass transport barrier and the anode current collector which forms a plurality of laterally displaced openings corresponding to the plurality of laterally displaced protrusions, wherein when the movable plate is adjusted to a closed position, the protrusions interconnect with the openings in the anode current collector to substantially seal the openings, and the movable plate also having apertures therein interspersed with the protrusions in such a manner that when the movable plate is in an open position, the apertures allow for flow of fuel therethrough; wherein the movable plate is adjustable in a direction perpendicular to the plane in which the plate is disposed, such that when it is adjusted, the plate travels generally in a z-axis within the vapor gap, closer to or further away from the anode current collector, to control fuel flow while not consuming substantially additional volume within the fuel cell. The Tan reference discloses the concept of utilizing a diaphragm "34" supporting a valve plug "60" to plug the opening "24" of a partition "22" such that the diaphragm is adjustable in a direction perpendicular to the plane in which the diaphragm is disposed such that when it is adjusted the diaphragm travels generally in a z-axis within chamber "26", closer to or further away from the partition to control the fluid flow (See Figures 1 and 2). It also discloses openings "44" & "50" that are interspersed with the valve plug in such a

matter that when the diaphragm is in a open position, the openings allow for fluid flow therethrough (See Figure 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Tanizaki/Guay fuel cell system to include a moving shutter plate having a plurality of laterally displaced protrusions disposed within the vapor gap between the passive mass transport barrier and the anode current collector which forms a plurality of laterally displaced openings corresponding to the plurality of laterally displaced protrusions, wherein when the movable plate is adjusted to a closed position, the protrusions interconnect with the openings in the anode current collector to substantially seal the openings, and the movable plate also having apertures therein interspersed with the protrusions in such a manner that when the movable plate is in an open position, the apertures allow for flow of fuel therethrough; wherein the movable plate is adjustable in a direction perpendicular to the plane in which the plate is disposed, such that when it is adjusted, the plate travels generally in a z-axis within the vapor gap, closer to or further away from the anode current collector, to control fuel flow while not consuming substantially additional volume within the fuel cell in order to utilize a means for managing flow in a computer based fluid handling system that provides fast response to an electrical control signal.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanizaki et al (JP 4-274174) in view of Guay (US 2005/0058879) and Tan (US 5687759) as applied to claim 5 above, and further in view of Cleveland et al (US 4047695).

However, Tanizaki et al as modified by Guay and Tan does not expressly teach protrusions that have angled sides; and openings in the anode current collector being correspondingly angled such that the protrusions interconnect securely within the angled openings of the current collector to substantially seal the openings against fuel flow. The Cleveland reference discloses a plug "24" that extends through the seal "26" to define a tapered annular flow orifice through which fluid may pass, wherein the plug is axially movable with respect to the seat throughout a full range of positions, including a closed position in which the tapered surfaces of the two members are brought into mating contact (See column 2, lines 53-59 and Figure 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Tanizaki/Guay/Tan fuel cell system to include protrusions that have angled sides; and openings in the anode current collector being correspondingly angled such that the protrusions interconnect securely within the angled openings of the current collector to substantially seal the openings against fuel flow so that fuel flow would become centralized and pass smoothly through the tapered annular orifice to the catalyst layers of the fuel cell (See column 2, lines 23-26).

Examiner's note: The Cleveland reference is relevant to the Tanizaki reference, Guay reference, Tan reference, and the applicant's field of endeavor because it solves the same problem of controlling the flow of a fluid from an inlet to an outlet.

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanizaki et al (JP 4-274174) in view of Guay (US 2005/0058879) and Tan (US 5687759) as applied to claim 5 above, and further in view of Fukano et al (US 2003/0102032).

However, Tanizaki et al as modified by Guay and Tan does not expressly teach protrusions that are substantially comprised of a compliant material that is compressed into the openings when the movable plate is adjusted to a closed position. The Fukano reference discloses a valve plug "102 that is made of a flexible material such as a resin material or a rubber material that opens/closes the fluid passage by separating from a seat section "106" (See paragraphs [0046],[0047] and Figure 3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Tanizaki/Guay/Tan fuel cell system to include protrusions that are substantially comprised of a compliant material that is compressed into the openings when the movable plate is adjusted to a closed position in order to utilize a material that forms a stronger seal around the openings when the movable plate is adjusted to a closed position.

Examiner's note: The Fukano reference is relevant to the Tanizaki reference, Guay reference, Tan reference, and the applicant's field of endeavor because it solves the same problem of controlling the flow of a fluid from an inlet to an outlet.

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanizaki et al (JP 4-274174) in view of Guay (US 2005/0058879) and Tan (US 5687759) as applied to claim 5 above, and further in view of Griffin (US 2003/0213519).

However, Tanizaki et al as modified by Guay and Tan does not expressly teach a coating disposed on the sides of the protrusions in the movable plate which further secures sealing of the anode current collector against fuel flow therethrough. The

Griffin discloses a valve plug "148" that has a vulcanized rubber coating "148A" on the exterior of the valve plug (See paragraph [0055]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Tanizaki/Guay/Tan fuel cell system to include a coating disposed on the sides of the protrusions in the movable plate in order to provide a fluid-tight seal against the openings of the anode current collector.

Examiner's note: The Griffin reference is relevant to the Tanizaki reference, Guay reference, Tan reference, and the applicant's field of endeavor because it solves the same problem of controlling the flow of a fluid from an inlet to an outlet.

10. Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirsch et al (US 2004/0209133) in view of Tan (US 5687759).

The Hirsch reference discloses a fuel cell system comprising: a fuel tank "110"; and a direct methanol fuel cell "102" including: a proton conductive membrane having catalyst coatings on each of its major surfaces, being an anode aspect "104a" and a cathode aspect "104b"; an anode current collector "109a" disposed generally at the anode aspect; a cathode current collector "109b" disposed generally at the cathode aspect; a methanol delivery film "212" disposed generally between the fuel tank and the anode aspect and spaced from the anode aspect to define a vapor gap in the fuel cell that controls the rate of fuel delivery to the anode aspect; a fuel delivery regulation assembly "220" comprising a first component "302a" that is disposed within the vapor gap between the methanol delivery film and the anode current collector such that the first component is adjustable to substantially or partially prevent fuel flow through the

anode current collector to the anode aspect of the fuel cell; and a load "108" coupled between the anode current collector and the cathode current collector for utilizing the electricity generated by the fuel cell (See paragraph [0047],[0052] and Figure 2).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

However, Hirsch et al does not expressly teach a moving component having a plurality of laterally displaced protrusions and a receiving element forming a plurality of laterally displaced openings corresponding to the plurality of laterally displaced protrusions. The Tan reference discloses the concept of utilizing a diaphragm "34" supporting a valve plug "60" to plug the opening "24" when the diaphragm is place

adjacent to the receiving element "22" (See Figures 1 and 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Hirsch fuel cell to include a moving component having a plurality of laterally displaced protrusions and a receiving element forming a plurality of laterally displaced openings corresponding to the plurality of laterally displaced protrusions in order to utilize a means for managing flow in a computer based fluid handling system that provides fast response to an electrical control signal.

Examiner's note: The Tan reference is relevant to the Hirsch reference and the applicant's field of endeavor because it solves the same problem of controlling the flow of a fluid from an inlet to an outlet.

Response to Arguments

11. Applicant's arguments filed 9/19/07 have been fully considered but they are not persuasive.

The applicant argues that it would not have been obvious to one of ordinary to one of ordinary skill in the art based on Tan with any other reference to make a membrane out of a plurality laterally displaced protrusions over a wide surface area compared to the thickness of the membrane in order to control the flow of vapors/fuels through a fuel cell. The examiner disagrees because the Tan reference is relied upon for the teaching of the concept of utilizing a diaphragm supporting a valve plug to plug the opening when the diaphragm is place adjacent to the receiving element in order to

control the flow of a fluid. Although the Tan reference discloses a single servovalve assembly having only a singular protrusion, one skilled in the art would know that a plurality of protrusions that are formed on a plate would be necessary to correspond to the plurality of openings on the anode collector plate in order to control the flow of the reactant.

The applicant also argues that Tanizaki and Hirsch teach away from moving a plurality of laterally displaced protrusions to match with corresponding openings. The examiner disagrees because although Tanizaki and Hirsch do teach laterally moving/sliding shutter plates, there is no teaching of why one skilled in the art could not utilize a different mechanism for controlling the flow of the reactant. In addition, the substitution of one known mechanism for controlling the flow of a reactant for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571) 272-0717. The examiner can normally be reached on M-F, 7:00AM to 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC


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PRIMARY EXAMINER